

REMARKS

Status

Claims 1-14 were pending in this Office Action. This response does not cancel or add any claims. Accordingly, it is claims 1-14 which are at issue.

The Office Action

In the Office Action mailed June 7, 2006, claims 1-8, 11 and 13-14 were rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent 6,274,461 of Guha. Claims 9-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Guha in view of U.S. Published Application 2003/0036090 of Patil. Claim 12 was rejected under 35 U.S.C. §103(a) as being unpatentable over Guha in view of U.S. Patent 5,786,023 of Maxwell.

Applicant thanks the Examiner for the Office Action.

The Present Invention

This invention is directed to a method for the plasma deposition of a high quality layer of **microcrystalline** semiconductor material. In fact, microcrystalline semiconductor materials have higher electrical conductivities and better stabilities than do corresponding amorphous semiconductor materials (page 4 line 16 -18). As described in the specification, microcrystalline semiconductor materials have particular advantages in certain electronic applications; however, the electrical qualities of these materials are very dependent upon their morphology. In general, microcrystalline materials exhibiting columnar growth, large grain sizes and high defect grain boundaries often manifest poor electrical performance. This invention recognizes that in a plasma deposition process for the preparation of microcrystalline semiconductor materials, the degree of dilution of a process gas must be varied as the thickness of the deposited layer increases in order to provide for optimized microcrystalline semiconductor materials. As

emphasized in the application, and in prior correspondence with the Patent Office, the prior art has not recognized this fact and does not show or suggest any deposition process in accord with the claims at issue.

The Rejections under 35 U.S.C. §102

It is the Examiner's position, as stated in the previous Office Action, and as is restated in this Office Action, that claims 1-8, 11 and 13-14 are anticipated by U.S. Patent 6,274,461 of Guha. The Examiner's position is in error. The '461 patent of Guha is not at all directed to the preparation of a microcrystalline material. It is specifically directed to the preparation of high quality **amorphous** semiconductor materials.

In one aspect, the '461 patent of Guha teaches that the best photovoltaic devices are manufactured when photogenerating material is "**amorphous**...from material obtained under deposition conditions just below the threshold of microcrystalline growth." (column 1 lines 51-59).

In another aspect, the '461 teaches that "the presence of grain boundaries in **microcrystalline** material can **adversely** affect the performance of the photovoltaic devices...if the semiconductor material is deposited...problems of device efficiency and stability also arise." (column 2 lines 8-13).

As such, the Guha '461 patent specifically teaches a deposition process which is controlled and optimized to **avoid** the deposition of microcrystalline semiconductor material. As such, it does not anticipate or suggest the presently claimed invention. Applicant very specifically pointed this out in the previously filed response and in that regard cited to particular passages in Guha '461 describing such teaching away.

In the present Office Action, the Examiner repeats the original rejection based upon Guha '461 and provides a brief rebuttal to Applicant's arguments in section 6 thereof. These arguments comprise one sentence which is reproduced hereinbelow:

In response, the examiner disagrees with applicant's argument because the patent No. US 6,274,461 of Guha et al clearly teaches a process for the plasma deposition of a layer of semiconductor material, wherein the deposited semiconductor material is amorphous or microcrystalline (see col. 2, lines 43-61).

The Examiner is completely wrong in relying upon this passage of Guha '461 to support the rejection under 35 U.S.C. §102. The referred-to passage describes a plasma deposition process and states, in relevant portions:

The deposition parameters of the process ... will determine whether the deposited semiconductor material is amorphous or microcrystalline; and most preferably, deposition is carried out under conditions just below the amorphous/microcrystalline threshold so as to produce a relatively ordered amorphous material.

It is clear from the passage, and from reading the entire section in the context of the disclosure of the '461 patent, that the '461 patent is acknowledging that plasma deposition processes may be operated so as to produce amorphous or microcrystalline materials. This is well known in the prior art, and Applicant acknowledges such in the present application. What the passage of the Guha '461 patent goes on to make clear is that in accord with the disclosed invention, the parameters of the deposition process are selected so that the process operates near, but below, the amorphous/microcrystalline threshold so as to produce an **amorphous material**. The teaching of Guha '461 is that a superior quality amorphous material is prepared by maintaining deposition conditions near, but below, the amorphous/microcrystalline threshold. There is no teaching in Guha '461 of processes for preparing superior microcrystalline materials by controlling deposition parameters in accord with the claims at issue. The mere fact that Guha

'461 acknowledges that microcrystalline materials can be made does not anticipate or make obvious the presently claimed invention.

In the prior record, and in this response, Applicant has provided detailed explanations of the present invention, its advantages, and its distinctions over prior art processes as represented by Guha '461. The Examiner has cited to no teaching at all in the prior art showing or suggesting that superior quality microcrystalline semiconductor materials can be prepared in the plasma deposition process by varying the concentration of a diluent in the process gas as a function of the thickness of the depositing layer of microcrystalline semiconductor material. As such, the Examiner has not presented any evidence defeating the novelty or obviousness of the present invention.

The Rejections under 35 U.S.C. §103

Claims 9-10 are cancelled.

Claim 12 is submitted for reconsideration for allowance for the reasons below: Maxwell as cited by the Examiner directs to method and apparatus for fabricating three-dimensional structures, and more specifically relates to the deposition of a solid. However, Maxwell makes no mention of any teaching regarding "process gas" or "semiconductor precursor", therefore Maxwell does not anticipate claim 12 of the present invention.

Conclusion

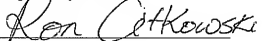
The present remarks are submitted after entry of a final rejection. The Examiner is respectfully requested to review these remarks, reconsider and withdraw the rejections, and pass this application on to issuance.

Should the Examiner not be inclined to allow this application, he is respectfully requested to enter this response into the file history of this application for purposes of appeal. Entry of the

response will not necessitate any further search, or otherwise burden the Examiner, and it will narrow and focus the issue for appeal.

Any questions, comments or suggestions which the Examiner may have should be directed to the undersigned attorney.

Respectfully submitted,



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